

CONSENSUS STATEMENT

Classification and Grading of Chronic Venous Disease in the Lower Limbs. A Consensus Statement

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Part I: Classification

Chronic venous disease is an important cause of discomfort and disability and is present in a significant percentage of the population worldwide. Methods to diagnose and measure severity have evolved rapidly so that accurate classification of venous disease is now possible. Standards for reporting venous disease have been based on a clinical classification developed in 1988 by a subcommittee of the Society for Vascular Surgery (SVS) and International Society for Cardiovascular Surgery (ISCVS).¹ This classification has contributed to the uniform presentation of diagnosis and results of treatment. However, advances in the knowledge of chronic venous disease have created a need to expand definitions to cover many aspects including anatomy, pathophysiology, and etiology. The aim of this document is to present a more precise classification of chronic venous dysfunction which is simple enough to encourage its universal acceptance. Acceptance of a standard classification provides a basis for uniformity

in reporting and assessing different modalities of diagnosis and treatment.

The classification has been developed under the following headings:

Table 1. Classification.

C	for Clinical signs (Grade 0-6), supplemented by (A) for asymptomatic and (S) for symptomatic presentation
E	for Etiologic Classification (Congenital, Primary, Secondary)
A	for Anatomic Distribution (Superficial, Deep, or Perforator, alone or in combination)
P	for Pathophysiologic Dysfunction (Reflux or Obstruction, alone or in combination)

Clinical classification (C₀₋₆)

The clinical classification is based on objective clinical signs of chronic venous disease (C₀₋₆) supplemented according to presentation (A) for asymptomatic (e.g. C_{0-6,A}) or (S) for symptomatic limbs (e.g. C_{0-6,S}). Symptoms include aching, pain, congestion, skin irritation and muscle cramps as well as other complaints attributable to venous dysfunction. This clinical classification is organised in terms of ascending

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severity of disease.¹ Limbs in higher categories have more severe manifestations of chronic venous disease and may have some or all of the findings associated with less severe categories.

Table 2. Clinical classification.

Class 0	No visible or palpable signs of venous disease
Class 1	Telangiectases or reticular veins
Class 2	Varicose veins
Class 3	Edema
Class 4	Skin changes ascribed to venous disease (e.g. pigmentation, venous eczema, lipodermatosclerosis)
Class 5	Skin changes as defined above with healed ulceration
Class 6	Skin changes as defined above with active ulceration

Therapy may alter the clinical signs and symptoms and the limb should be reclassified after treatment.

Telangiectases are defined as dilated intradermal venules up to a diameter of approximately 1 mm and reticular veins are defined as dilated subdermal veins up to a size of about 4 mm which are not palpable. Varicose veins are palpable, dilated subcutaneous veins usually larger than 4 mm.² Telangiectases and reticular veins are separated from varicose veins in this classification as it is considered that the telangiectases do not lead to venous ulceration while the reticular veins may.² Both may be associated with patient symptoms.³

Etiologic classification (E_C , E_P or E_S)

This etiologic classification recognises three categories of venous dysfunction: congenital, primary, and secondary. Congenital problems may be apparent at birth or be recognised later. Primary problems are neither congenital nor do they have an identifiable cause. Secondary problems are those acquired conditions that have a known pathologic cause, such as thrombosis. These categories are mutually exclusive.

Table 3. Etiologic classification.

Congenital (E_C)
Primary (E_P) — with undetermined cause
Secondary (E_S) — with known cause
Post-thrombotic
Post-traumatic
Other

Anatomic classification ($A_{S,D,P}$)

This classification describes the anatomic extent of venous disease whether in the superficial (A_S), deep (A_D) or perforating (A_P) veins. Disease may involve one, two, or all three systems.

For those reports for which greater detail is required, the site and extent of involvement of the superficial, deep, and perforating veins may be categorised using the anatomic segments listed in Table 4.

Table 4. Anatomic classification.

Segment #	Superficial veins (A_S):
1	Telangiectases/reticular veins
2	Greater (long) saphenous (GSV)
3	Above-knee
4	Below-knee
5	Lesser (short) saphenous (LSV)
6	Non-saphenous
7	Deep veins (A_D):
8	Inferior vena cava
9	Iliac
10	Common
11	Internal
12	External
13	Pelvic - Gonadal, broad ligament, other
14	Femoral
15	Common
16	Deep
17	Superficial
18	Popliteal
19	Crural - anterior tibial, posterior tibial, peroneal (all paired)
20	Muscular - Gastrocnemial, soleal, other
21	Perforating veins
22	(A_P):
23	Thigh
24	Calf

Pathophysiologic classification ($P_{R,O}$)

Clinical signs and symptoms of venous dysfunction may be the result of reflux (P_R), obstruction (P_O) or both ($P_{R,O}$). Therefore, the simplest pathophysiologic classification of a limb would be P_R , P_O , or $P_{R,O}$.

Table 5. Pathophysiologic classification.

Reflux (P_R)
Obstruction (P_O)
Reflux and Obstruction ($P_{R,O}$)

Because the severity of venous dysfunction is determined by the location and anatomic extent of reflux and/or obstruction^{4,5} it may be desirable to report this in greater detail by using the anatomic segments listed in Table 4. The availability of duplex scanning allows this to be done non-invasively.⁶⁻¹³ In addition, it may be appropriate to report duplex-derived severity and duration of reflux,^{8,9,14} as presented in part III.

Reporting of segmental obstruction can be simplified and standardised using the well-recognised major sites of occlusion,¹⁵ caval, iliac, femoral, popliteal and crural (P_{0-Cav} P_{0-I} P_{0-F} P_{0-P} P_{0-C}).

If obstruction is more extensive, this can also be reported using multiple subscripts (e.g. $P_{0-I,F,P}$). Functional obstruction is discussed in part III.

Part II: Scoring of Venous Dysfunction

A scoring system of chronic venous dysfunction provides a numerical base for scientific comparison of limb condition and evaluation of results of treatment. This is based on three elements: the number of anatomic segments affected (anatomic score); grading of symptoms and signs (clinical score); and disability (disability score). Although the grading of symptoms is subjective, the grading of signs is objective. The accuracy of this scoring system needs to be tested and may be modified in the future as experience accumulates.

Anatomic score

This is the sum of the anatomic segments, each scored as one point (Table 4).

Clinical score

This is the sum of the values assigned to the signs and symptoms listed below:

Table 6. Clinical score.

Pain	(0 = none; 1 = moderate, not requiring analgesics; 2 = severe, requiring analgesics)
Edema	(0 = none; 1 = mild/moderate; 2 = severe)
Venous Clau- dication	(0 = none; 1 = mild/moderate; 2 = severe)
Pigmentation	(0 = none; 1 = localised; 2 = extensive)
Lipodermato- sclerosis	(0 = none; 1 = localised; 2 = extensive)
Ulcer — Size (largest ulcer)	(0 = none; 1 = < 2 cm diameter; 2 = > 2 cm diameter)
Ulcer — Dur- ation	(0 = none; 1 = < 3 months; 2 = > 3 months)
Ulcer — Re- currence	(0 = none; 1 = once; 2 = more than once)
Ulcer — Number	(0 = none; 1 = single; 2 = multiple)

Table 7. Disability score

0	Asymptomatic
1	Symptomatic, can function without support device
2	Can work 8-hour day only with support device
3	Unable to work even with support device

Part III: The Diagnostic Process

The history and physical examination are the basis for the initial evaluation of patients with suspected chronic venous disease.¹⁶ Since valvular incompetence or obstruction form the basis for most complications, the continuous-wave (CW) Doppler can be used at the time of the initial clinical evaluation to assist in the diagnosis.^{17,18} Absence or diminution of a Doppler velocity signal despite an augmentation maneuver suggests obstruction. Reflux may be detected with a Valsalva manoeuvre or limb compression. Because CW Doppler provides subjective information, if positive, findings should be followed by objective test.

If a patient presents with symptoms that are questionably related to venous disease such as mild edema or aching, a non-invasive test may be required. Duplex scanning is the method of choice used to confirm or exclude the presence of venous dysfunction.⁶⁻¹⁴ In the absence of duplex scanning, strain-gauge plethysmography,^{17,19} air-plethysmography (APG)^{20,21} or photoplethysmography (PPG)^{22,23} may be used. Because the accuracy of PPG has been

challenged,²⁴⁻²⁶ confirmation of the presence of chronic venous disease by another technique may be required if PPG is positive.

Duplex scanning has become the method of choice for testing individual veins of the superficial, deep, and perforating systems.⁶⁻¹³ If the problem is confined to superficial veins, duplex scanning will determine whether this involves the greater and/or lesser saphenous veins and their tributaries. It can also detect the presence of incompetent perforating veins.^{5,27,28} In addition, duplex scanning can determine the anatomy of veins in the popliteal fossa.²⁹⁻³¹ Also, it will detect reflux at other sites such as vulval veins or lateral thigh incompetent perforating veins. In the presence of deep venous disease, duplex scanning will determine whether the problem is due to anatomic obstruction, reflux or both. In addition, it will provide information about the anatomic extent. Measurements to quantify reflux in individual veins by duplex scanning have been recently developed such as valve closure time,⁹ venous reflux index³² and velocity at peak reflux¹⁴ but experience with these is still limited.³³ Several other methods to quantify reflux are available. They include strain-gauge plethysmography,^{17,19} foot volumetry^{34,35} and the more recently developed air-plethysmography,^{20,21} which measures global reflux in ml/s. Ascending and descending phlebography should be performed when deep venous valvular reconstruction is contemplated.^{36,37}

A number of tests are available to determine the functional severity of chronic obstruction. They include the arm-foot pressure differential,³⁸ the outflow fraction using air-plethysmography^{16,39} and femoral or popliteal pressure measurements during exercise.^{40,41} Ascending phlebography should be performed if venous reconstruction (bypass) is being considered.

Ambulatory venous pressure is a test measuring global venous hypertension.^{42,43} A high ambulatory venous pressure is associated with a high incidence of ulceration.⁴⁴

In the presence of both obstruction and reflux, quantitative tests outlined above can be used to assess which is predominant.

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Commentary

The aim of providing a classification with the purpose of putting order and comparability into communications on chronic venous disease is warmly applauded. The diversity of diagnostic tools and therapeutic options in recent years underscores the need. The Hawaii group have made a brave attempt.

It has to be said however that the medical literature is littered with classifications which have not received general endorsement. Usually this is because of excessive complexity. As the authors state it needs to be "simple enough to encourage universal acceptance". A coding or scoring system which requires either feats of memory or constant reference to keys will not be used. The classification needs to be practically orientated both in terms of patient identification and treatment options; enabling patients to be placed into mutually exclusive categories.

The Hawaii group have attempted to make their classification all-encompassing. This, from a practical clinical viewpoint is not necessary. Secondly, within some of the tables, attempts have been made to classify on more than one theme. For example it is not possible to have a rational classification which provides a gradation of severity and at the same time separately categorises a range of pathologies some of which are specific to venous disease (lipodermatosclerosis) and some of which are not (edema); some which are indices of severity of venous insufficiency (active ulcer) and some are not (telangiectasis). What is required is a working classification of chronic venous disease relating to valvular incompetence and/or obstruction. Congenital venous anomalies are, in our opinion, a separate clinical problem and better dealt with independently.

We would propose that nothing more is required than two basic classifications: the first an index of severity based on symptomatology. For this we suggest the following modification of Table 2:-

Table 2. Clinical presentation.

Grade 1	Asymptomatic
Grade 2	Cosmetic/trivial pain or swelling
Grade 3	Severe pain/swelling
Grade 4	Skin change (lipodermatosclerosis) without ulcer
Grade 5	Chronic ulceration

It is conceded that even within so simple a classification there may be difficulties. The point at which "skin change" is said to have occurred may be difficult to define. When does an ulcer become "chronic". Our

working definition in clinical trials is 4 weeks. These limitations, however, are arguments in favour of pragmatic simplicity rather than increasing complexity which compound the difficulties.

The second classification we propose is one of simple morphology which can be easily applied and related to treatment options:-

Morphology

1. Primary
 - 1.1 Superficial incompetence alone (Long/short saphenous + /- perforator incompetence)
 - 1.2 Deep incompetence + /- superficial incompetence (without evidence of post-phlebitic damage)
 2. Secondary (post-phlebitic/traumatic)
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The criteria for establishing the definition of incompetence are likely to vary. These would either have to be stated in individual communications or universally agreed. There may be uncertainty as to the presence or absence of post-phlebitic damage, a critical factor in outcome, but this is a problem for any system. We feel

it better to combine "trauma" and "post-phlebitic" under a single category. The distinction is of academic interest only. The implications are the same.

A point worthy of further debate is whether there needs to be further refinement of patients with primary deep incompetence with or without co-existing superficial (saphenous) incompetence. Similarly the separation of perforator incompetence from deep or superficial incompetence, or both, would lead to added layers of complexity, best left for authors to enumerate at the time of communication.

Regarding the remainder of the classification, we do not see a practical role for the anatomical classification. Currently communications which present information on venous anatomy do so quite adequately utilising existing anatomical terms. If the purpose of the classification were to enable the researcher to construct a mathematical score of involved venous segments this classification would not help.

The scoring of venous dysfunction duplicates and further complicates Table 2. We are doubtful as to the precision or utility of the disability score. Diagnostic process is clearly of value and could be agreed more widely and then possibly integrated into the definitions of morphology.

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